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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 29

Application Number: 09/371,972
Filing Date: August 10, 1999
Appellant(s): IOURCHA ET AL.

Susan Yee
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 03/08/2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-18 and 23-29 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

6,108,007	SHOCHET	8-2000

6,204,856 WOOD et al. 3-2001

Foley et al., "Computer Graphics: Principles and Practice", July 1997, Addison-Wesley Publishing Company, pages 668-672 and 736-737

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-18, and 23-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Wood et al., U.S. Patent Number 6,204,856, "Attribute Interpolation in 3D Graphics", class 345/429, 03/2001, filed 07/1998.

As per independent claim 1, in a graphics system, a computer-implemented method of rendering a graphic primitive . . . method comprising: receiving a signal from an interface . . . about a plurality of vertices of the primitive and an independent variable; Wood discloses input to receive attribute data of the vertices, col. 5, lines 32-35; determining a channel value for each of the plurality of vertices of the primitive . . . ; Wood discloses determining a parameter value of a position within a triangle from the

attribute value at each vertex, col. 2, lines 6-19; randomly selecting an interior point . . . ; Wood discloses determining parameter values for positions within a triangle, col. 2, lines 12-14; selecting at least two side points . . . ; Wood discloses calculating pixel attribute values by interpolating values at each triangle vertices, col. ,2 lines 1-5; determining an interpolated channel value with an interpolation engine . . . ; Woods discloses interpolation means, col. 2, line 50; and determining a channel value . . . . Wood discloses calculating parameter values for position within a triangle from stored attribute values form each triangle, col. 2, lines 14-19.

With respect to dependent claim 2, determining the interpolated channel value for each of the at least two side points further comprises performing linear interpolation . . . Wood discloses using incremental interpolation, col. 1, lines 51-61, and interpolation means, col. 2, lines 51-51.

With respect to dependent claim 3, determining the interpolated channel value for each of the at least two side points further comprises performing perspective interpolation . . . Wood discloses perspective correction by interpolation, col. 3, lines 53-65.

With respect to dependent claim 4, repeating each of the steps in claim 1 for a plurality of points . . . Wood discloses performing tests for each sample point during interpolation, col. 10, lines 49-50.

With respect to dependent claims 5-7, channel value represents color (luminance; texture). Wood discloses attribute data including color and texture, col. 1, lines 20-22. Wood further discloses shading calculating done on a per pixel basis, col.

9, lines 63-67, and further discloses not compromising attributes for shading and texturing, col. 11, lines 62-65, thus making it inherent to include luminance parameters for interpolating.

As per independent claim 8, it is rejected based upon similar rational as above independent claim 1. Wood further discloses performing a routine to the input data, col. 5, lines 36-41.

As per independent claim 9, it is rejected based upon similar rational as above independent claim 1.

With respect to dependent claims 10 and 11, determining the channel values of end points of the first (second) edge to determine the channel value . . . Wood discloses calculating control values along each edge of a triangle along with the triangle attributes, col. 1, lines 51-61.

With respect to dependent claim 12, using depth values of the first point and second point to determine a channel value . . . Wood discloses using depth values for projecting the model, col. 1, lines 25-35.

As per independent claim 13, it is rejected based upon similar rational as above independent claim 1. Wood further discloses performing a routine to the input data, col. 5, lines 36-41.

As per independent claim 14, it is rejected based upon similar rational as above independent claim 1. Wood further discloses interpolation means, data handling means, calculation means, projections means and pixel shading means, col. 2, lines 46-67.

As per independent claim 15, it is rejected based upon similar rational as above independent claim 1.

As per independent claims 23 and 27, they are rejected based upon similar rational as above independent claim 1.

With respect to dependent claims 24 and 25, they are rejected based upon similar rational as above dependent claims 5 and 7.

With respect to dependent claim 26, calculating a screen-based Z coordinate for the point based upon the independent variable X, vertex values . . . and depth values . . . Wood discloses using the homogeneity divisor, depth value to give spatial coordinates, col. 1, lines 25-35.

With respect to dependent claim 28 and 29, they are rejected based upon similar rational as above dependent claims 2 and 3 respectively.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-18 and 23-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over the book "Computer Graphics Principles and Practice" by Foley et al., in view of Shochet, U.S. Patent Number 6,108,007, "Method, System, and Computer

Program Product for Increasing Interpolation Precision using Multi-Channel Texture Mapping", class 345/582, 08/2000, filed 10/1997.

As per independent claim 1, in a graphics system, a computer-implemented method of rendering a graphic primitive . . . method comprising: receiving a signal from an interface . . . about a plurality of vertices of the primitive and an independent variable; determining a channel value for each of the plurality of vertices of the primitive . . . ; randomly selecting an interior point . . . ; selecting at least two side points . . . ; determining an interpolated channel value with an interpolation engine . . . ; and determining a channel value . . . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

However, it is noted that Foley fails to disclose receiving a signal from an interface with channel values or parameter data. Shochet discloses data comprising an image sample and further discloses the data consisting of a single channel value, col. 2, lines 35-64, and further discloses an interpolator unit and determining an interpolated pixel value. It would have been obvious to one of ordinary skill in the art at the time of the invention of Foley to include means for receiving the three-dimensional graphics data through the interface of Shochet because it is necessary to include input data for graphics processing.

With respect to dependent claim 2, determining the interpolated channel value for each of the at least two side points further comprises performing linear interpolation . . .

Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

With respect to dependent claim 3, determining the interpolated channel value for each of the at least two side points further comprises performing perspective interpolation . . . Foley discloses a z-buffering technique, pages 668-672. Shochet discloses determining an appropriate projection, col. 1, lines 54-55.

With respect to dependent claim 4, repeating each of the steps in claim 1 for a plurality of points . . . Foley discloses calculating a z value for each pixel or polygon point, page 668. Shochet discloses accumulating data for a number of samples, col. 3, lines 22-23.

With respect to dependent claims 5-7, channel value represents color (luminance; texture). Foley discloses using color components for interpolation, page 737. Shochet discloses color, luminance and or texture channel values, col. 3, lines 5-7.

As per independent claim 8, it is rejected based upon similar rational as above independent claim 1.

As per independent claim 9, it is rejected based upon similar rational as above independent claim 1.

With respect to dependent claim 10, determining the channel values of end points of the first edge to determine the channel value . . . Foley discloses and equation

that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

With respect to dependent claim 11, determining the channel values of end points of the second edge to determine the channel value . . . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

With respect to dependent claim 12, using depth values of the first point and second point to determine a channel value . . . Foley discloses using depth values of the first and second points to determine the interior point, pages 668-672, see also Figure 15.23.

As per independent claim 13, it is rejected based upon similar rational as above independent claim 1.

As per independent claim 14, it is rejected based upon similar rational as above independent claim 1.

As per independent claim 15, it is rejected based upon similar rational as above independent claim 1.

As per independent claims 23 and 27, they are rejected based upon similar rational as above independent claim 1.

With respect to dependent claims 24 and 25, they are rejected based upon similar rational as above dependent claims 5 and 7.

With respect to dependent claim 26, calculating a screen-based Z coordinate for the point based upon the independent variable X, vertex values . . . and depth values . . . Foley discloses a z-buffering technique, pages 668-672. Shochet discloses determining an appropriate projection, col. 1, lines 54-55.

With respect to dependent claim 28 and 29, they are rejected based upon similar rational as above dependent claims 2 and 3 respectively.

(11) Response to Argument

Applicant's arguments filed 03/08/2004 have been fully considered but they are not persuasive.

Applicant argues that Wood fails to disclose randomly selecting an interior point within the graphic primitive. Wood discloses render pixel images composed of triangular primitives and projecting into an image plane and a generalized interpolation function determining the parameter values within the triangle, abstract. Wood further discloses in figure 5, element 510, choosing a point, a triangle with a point inside the triangle, and at some point the perspective correct value can be calculated, col. 3, lines 39-65. It is inherent that the if one selects a point without a pattern or unsystematically, the point chosen is chosen at random, see figure 1, Wood, and figures 2A-2C of applicants drawings each show a point P chosen at random.

Applicant further argues that Woods discloses determining values at positions within the triangle and not randomly selected points. It is further inherent that if the invention of Woods determines values for interior points within a triangle, the invention of Woods meets Applicant's claim limitation of random points, because the interior points selected are selected at random and any interior point, random points, adjacent points, etc., within a polygon can be determined.

Applicant argues that Wood teaches values at positions within the triangle using incrementally interpolated attributes for each triangle. Wood discloses in abstract using a generalized interpolation function in terms of the parameterising coordinate system determining parameter values within the triangle in terms of the two-dimensional coordinate system. Therefore it is the Examiner's interpretation that Woods does not disclose incrementally interpolation, but generalized interpolation functions.

Applicant argues that Wood only illustrates the parameters in the view of a triangle with a point inside the triangle having coordinates and depicting a single point in a figure does not disclose or suggest randomly selecting. Wood discloses and shows in figure 1, a randomly selected point P. Wood further discloses at some point the perspective correct value can be calculated, col. 3, lines 39-65, which Examiner interprets as randomness.

Applicant argues that Wood fails to disclose receiving a signal from an interface comprising data about a plurality of vertices and an independent variable. Wood discloses input to receive data of triangular polygons comprising attributes for the vertices, col. 5, lines 31-48, and further states the main attribute is the coordinates for

the vertices, and further states each of the different auxiliary attributes such as coloring texture mapping, surface normals to generate an output pixel value. Wood further discloses perspective correction using a z value, therefore providing an independent variable, col. 3, lines 58-65.

Applicant argues that Wood fails to disclose determining a channel value for each of the vertices and the independent variable. Applicant specification describes the channel values as parameters determined for the vertex of the primitive, page 2 Applicant's specification. Wood discloses receiving data of triangular polygons, i.e. primitives, comprising attributes, i.e. parameters, for the vertices, col. 5, lines 31-48, where each of the different auxiliary attributes such as coloring texture mapping, surface normals to generate an output pixel value. Wood further discloses perspective correction using a z value, thus providing an independent variable, col. 3, lines 58-65.

Applicant further argues that Foley, Shochet or the combination fails to disclose randomly selecting an interior point to determine an interpolated channel value. . Foley discloses and equation that selects a random point, Ip and draws a horizontal line having endpoints Ia and Ib, and determines by interpolation the values of the endpoints Ia and Ib, and using the values of Ia and Ib to determine the value of the randomly selected interior point Ip, see figure 16.19.

Applicant argues that Foley teaches sequentially processing scan lines, and interpolating across scan lines and that the requirement of a line-by-line traversal to fill a span across a line is not a randomly selected point. Foley discloses the interpolation across a scan line and by indicating an equation, in which input values are used to

determine the output of a selected point, this allows the invention of Foley to used randomly selected points to plug into the equation, which is not dependent upon the scan lines.

Applicant argues that Shochet fails to disclose receiving a signal from an interface and randomly selecting an interior point of a graphic primitive. Shochet discloses the invention can be implement using software and that computer program can be received via communication interface to perform the features of the invention, col. 7, line 65 – col. 8, line 7. Shochet discloses separating pixels into groups in multiple channels and interpolating the pixel values for each channel to obtain an interpolated pixel value, abstract. Foley discloses an equation in figure 16.19, in which interpolation is performed along polygon edges. Foley discloses in the equation using the vertex endpoints and the x and y coordinates solving for an unknown value Ip, shown as a randomly selected interior point of a triangle primitive.

Applicant argues that Foley and Shochet both teach sequential interpolation and not randomly selecting an interior point. Foley and Shochet both teach scan line information to determine the endpoints of the triangle, and once the endpoints have been determined in a line by line traversal the point selected is an interior point selected at random and the equation is used to determine the interior point parameters.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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May 28, 2004

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